WASTEWATER DISCHARGE PERMIT: DATA TRACKING AND TECHNICAL FACT SHEET

Permittee: Sumitomo Bakelite North America, Inc.

PERMIT, ADDRESS, AND FACILITY DATA

PERMIT #:CT0003379 *APPLICATION #: 201302970*

Mailing Address:						*Location Address:*					
Street:	*24 Mill Street*					*Street:*	*24 Mill Street*				
City:	*Manchester*	*ST:*	*CT*	*Zip:*	*06042*	*City:*	*Manchester*	*ST:*	*CT*	*Zip:*	*06042*
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PERMIT INFORMATION

DURATION *5 YEAR _X_ 10 YEAR ___ 30 YEAR ___*

TYPE *New __ Reissuance _X_ Modification ___*

CATEGORIZATION *POINT (X) NON-POINT ()*

NPDES (X) PRETREAT () GROUND WATER (UIC) ( ) GROUND WATER (OTHER) ( )

*NPDES MAJOR **(MA)*** ___
*NPDES SIGNIFICANT MINOR or PRETREAT SIU **(SI)*** ___
*NPDES or PRETREATMENT MINOR **(MI)*** _X_
*PRETREAT SIGNIFICANT INDUS USER **(SIU)*** ___
*PRETREAT CATEGORICAL **(CIU)*** ___

SIC Code 3087

POLLUTION PREVENTION MANDATE __ ENVIRONMENTAL EQUITY ISSUE ___

SOLVENT MANAGEMENT PLAN

IS THE FACILITY OPERATING UNDER AN APPROVED SOLVENT MANAGEMENT PLAN? Yes __ No X
(Not applicable)

COMPLIANCE SCHEDULE *YES__ NO X__*

POLLUTION PREVENTION ___ TREATMENT REQUIREMENT___ WATER CONSERVATION___

WATER QUALITY REQUIREMENT ___ REMEDIATION ___ OTHER ___

RECENT ENFORCEMENT HISTORY

*IS THE PERMITTEE SUBJECT TO A PENDING ENFORCEMENT ACTION? YES ___ NO _X_*

OWNERSHIP CODE

Private _X_ *Federal* __ *State* __ *Municipal (town only)* __ *Other public* __

DEEP STAFF ENGINEER *Oluwatoyin Fakilede*
PERMIT FEES

Discharge Code	*DSN Number*	*Annual Fee*
102000b	*DSN 001-1*	*$ 2,290.00*

FOR NPDES DISCHARGES

Drainage basin Code: 4500 *Water Quality Standard: A*

NATURE OF BUSINESS GENERATING DISCHARGE

Sumitomo Bakelite North America, Inc. produces thermoset molding compounds through various production lines and related equipment. The process of compounding raw materials to produce molding compounds generates some heat. In order to reduce this heat, cold water is pumped from an on-site well through piping and cooling jackets and subsequently discharged.

PROCESS AND TREATMENT DESCRIPTION (by DSN)

DSN 101: This discharge is comprised of 450,000 gallons per day of non-contact cooling water. There is no treatment required for this discharge.

RESOURCES USED TO DRAFT PERMIT

__ *Federal Effluent Limitation Guideline 40CFR_____*

__ *Performance Standards*

__ *Federal Development Document _____*

__ *Treatability Manual*

_X_ *Department File Information*

_X_ *Connecticut Water Quality Standards*

_X_ *Anti-degradation Policy*

__ *Coastal Management Consistency Review Form*

_X_ *Other – Explain (See General Comments)*

BASIS FOR LIMITATIONS, STANDARDS OR CONDITIONS

_X_ *Case by Case Determination using Best Professional Judgment (See Other Comments)*
Oil and grease, total (MIL); pH (MIL); total suspended solids (AML, MDL, MIL)

_X_ *In order to meet in-stream water quality (See General Comments)*

Chlorine (MIL), copper and lead (AML, MDL, MIL); aquatic toxicity (MDL, MIL); temperature (MIL)

AML: Average Monthly Limit MDL: Maximum Daily Limit MIL: Maximum Instantaneous Limit

GENERAL COMMENTS

The previous permit had the zone of influence for the discharge listed as 36,413 gph and the in-stream waste concentration as 31.4%. In this permit, these were changed to 22,646 gph and 42.4% respectively. The changes are based on USGS information and DEEP staff's mathematical calculations (see Appendix A).

The need for inclusion of water quality based discharge limitations in this permit was evaluated consistent with Connecticut Water Quality Standards and criteria, pursuant to 40 CFR 122.44(d). Each parameter was evaluated for consistency with the available aquatic life criteria (acute and chronic) and human health (fish consumption only) criteria, considering the zone of influence allocated to the facility where appropriate. The reasonable potential statistical procedures outlined in the EPA Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) were employed to calculate the need for such limits. Comparison of monitoring data and its inherent variability with the calculated water quality based limits indicates a statistical probability of exceedance of such limits. Therefore, water quality based limits were included in this permit for total residual chlorine, copper and lead. Though these limits are lower than the limits in the previous permit, the Permittee is well able to comply with the limits. With the exceptions of lead data for November 30, 2011, that was 5µg/l, copper data for January 31, 2012, that was 6µg/l and total residual chlorine data that were 10µg/l in March and May 2012, all other data in the discharge monitoring report (DMR) from January 2010 – January 2015 are well below the proposed limits.

Implementation of the Antidegradation Policy follows a tiered approach pursuant to the federal regulations (40 CFR 131.12) and consistent with the Connecticut Antidegradation Policy included in the Connecticut Water Quality Standards (CTWQS). Tier 1 Antidegradation review applies to all permitted discharge activities to all waters of the state. Tiers 1 and 2 Antidegradation reviews apply to all new or increased discharges to high quality waters and wetlands, while Tiers 1 and 3 Antidegradation reviews apply to all new or increased discharges to outstanding national resource waters.

Although this is not a new permit, since the in-stream waste concentration was increased for this discharge, a Tier 1 Antidegradation Evaluation and Implementation Review was conducted to ensure that existing and designated uses of surface waters and the water quality necessary for their protection are maintained and preserved, consistent with CTWQS 2. All narrative and numeric water quality standards, criteria and associated policies contained in the CTWQS are the basis for the evaluation considering the discharge or activity both independently and in the context of other discharges and activities in the affected water body and considering any impairment listed pursuant to Section 303d for the Federal Clean Water Act or any TMDL established for the water body. The Department has determined that the discharge or activity is consistent with the maintenance, restoration, and protection of existing and designated uses assigned to the receiving water body by considering all relevant available data.

Lydall Brook is listed on the State's 305(b) list of impaired waters and the river is impaired for its designated uses of habitat for fish, other aquatic life and wildlife. The causes of impairment are unknown and a final total maximum daily load (TMDL) analysis has not been completed for the Lydall Brook (see Appendix B).

During a site inspection, the Department discovered that the sump pumps that are in the Permittee's well pit are piped to a nearby storm drain which discharges into Lydall Brook. The Permittee claims that there is usually no flow through these sump pumps when the well is operating during business hours and that groundwater is pumped only when the well is shut down which is typically during the weekends. The maximum flow from this sump was estimated to be about 4000 gallons per day when there is a discharge.

Since the sump pumps are part of the industrial water supply system for the Permittee's cooling activities, the discharge is associated with the production of the Permittee's water supply and therefore covered by the Water Treatment Wastewater General Permit. Under this general permit, the discharge of raw water such as this, is automatically covered and does not require submission of a registration form or fee. This discharge does not affect the allocated zone of influence in this permit because the discharge occurs mostly when the discharge covered under the NPDES discharge is not occurring.

OTHER COMMENTS

The sample type for zinc is listed as daily composite. This sample type was changed from grab that was in the previous permit, in order to obtain more representative sampling of the effluent over the period of the discharge. The Department also reevaluated the grab sampling for pH. The Permittee took six grab samples each, four hours apart, on 4/1/2013, 4/3/2013, 4/5/2013, 4/8/2013, 4/10/2013, 4/12/2013 and 4/15/2013. The pH of the forty-two (42) samples ranged from 7.20 to 8.23. The result showed that the pH of the discharge is fairly consistent. A review of DMR data from January 2012 to May 2013 also revealed a pH range of 7.66 – 8.12. The Department concluded that the pH of a grab sample collected would be representative of the pH of the wastewater discharge. Therefore, the Permittee can continue to take grab samples for pH testing.

Based on a Case by Case Determination using the criteria of Best Professional Judgment, the limits for total suspended solids were set using section 22a-430-4(s)(2) of the Regulations of Connecticut State Agencies (RCSA) as a guide. Limits lower than the limits in section 22a-430-4(s)(2) of the RCSA were included for oil and grease based on historical data and consistent with the previous permit in accordance with the anti-backsliding rule of section 22a-430-4(l)(4)(A)(xxiii) of the RCSA. The limits are protective of the waters of the state. The maximum daily limit has been set equivalent to the maximum instantaneous limit. DEEP staff decided that since there is minimal effluent variability and the Permittee can comply with the limit, there is no need to make the maximum instantaneous limit less stringent.

The sampling frequencies for total residual chlorine, copper, flow, lead, pH, temperature, total suspended solids and zinc in the previous permit were bi-monthly. These were changed to quarterly in this permit because the analytical data for total residual chlorine, copper, lead, and zinc were mostly below detection from January 2010 to January 2015. The new sampling frequencies are consistent with the prescribed sampling frequency in section 22a-430-3(j)(2) of the RCSA.

The water used for non-contact cooling is provided by an on-site well. Therefore, section 316(b) of the Federal Water Pollution Control Act does not apply to this discharge.

Section 316(a) Determination

Section 316(a) of the Federal Water Pollution Control Act, U.S.C. § 1326(a) provides that the thermal component of any discharge will assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the receiving water body. Therefore, this permit has the following narrative temperature requirement based on the Connecticut water quality standards: "The temperature of any discharge shall not increase the temperature of the receiving stream above 85°F, or, in any case, raise the normal temperature of the receiving stream more than 4°F. The permit also includes quarterly temperature monitoring and a maximum instantaneous limit of 85°F, which is the water quality criterion for the receiving stream. A review of the DMR from January 2010 – January 2015 showed a maximum temperature of 70.8 °F. The DMR data indicate that the Permittee is well able to comply with the permit limit of 85°F. Therefore, there was no need to allocate a zone of influence for the thermal component of the wastewater discharge.

APPENDIX A: WATER QUALITY BASED LIMITS CALCULATION

7Q10 OF THE RECEIVING STREAM

Section 22a-426-4(l) of the Regulations of Connecticut State states that "The Commissioner may, on a case-by-case basis, establish zones of influence when authorizing discharges to surface waters under sections 22a-430 and 22a-133(k) of the Connecticut General Statutes in order to allocate a portion of the receiving surface waters for mixing and assimilation of the discharge." The zone of influence for the receiving stream is calculated below:

$Cervione\ 7Q10 = 0.67A_{SD} + 0.01A_{till}$ $(Cervione\ et\ al, 1982[1])$

$where\ A_{SD}\ is\ the\ drainage\ area\ of\ the\ stratified\ drift\ and$

$A_{till}\ is\ the\ drainage\ area\ of\ the\ till\ covered\ bedrock$

$Drainage\ area = 3.25\ mi^2\ (USGS\ Connecticut\ Streamstats)$

$Drainage\ area\ of\ the\ stratified\ drift = 37.7\%\ of\ the\ drainage\ area\ (USGS\ Connecticut\ Streamstats)$

$Drainage\ area\ of\ the\ till\ covered\ bedrock = Drainage\ area - Drainage\ area\ of\ the\ stratified\ drift$

$Therefore,\ A_{SD} = 1.225\ mi^2 and\ A_{till} = 2.025\ mi^2$

$7Q10 = (0.67\ X\ 1.225) + (0.01\ X\ 2.025) = 0.841 cfs\ X\ 26{,}928\ (conversion\ factor) = 22646.45 \approx 22646 gph$

ZOI = $22646\ gph\ X\ 24\ hours = 543{,}504\ gpd$

$$Dilution\ Factor = \frac{AML + ZOI}{AML} = \frac{400{,}000 + 543{,}504}{400{,}000} = 2.359$$

$$IWC = \frac{1}{DF}\ X\ 100\% = \frac{1}{2.359}\ X\ 100\% = 42.39\% \approx 42.4\%$$

[1]*Cervione, M. A., Jr., Melvin, R.L., and Cyr, K.A., 1982, A method for estimating the 7-day, 10-year low flow of streams in Connecticut: Connecticut Water Resources Bulletin 34, 12 p.*

DMR analytical data (January 2010 – January 2015)

Date/Pollutant	*Chlorine (µg/l)*	*Copper (µg/l)*	*Lead (µg/l)*	*Zinc (µg/l)*
1/31/2010	*1.0**	*3.0*	*1.0**	*3.0*
3/31/2010	*1.0**	*1.0**	*1.0**	*1.0**
5/31/2010	*1.0**	*1.0*	*1.0**	*1.0**
7/31/2010	*1.0**	*4.0*	*1.0**	*1.0**
9/30/2010	*1.0**	*4.0*	*1.0**	*3.0*
11/30/2010	*1.0**	*1.0**	*1.0**	*23.0*
1/31/2011	*1.0**	*2.0*	*1.0**	*5.0*
3/31/2011	*1.0**	*2.0*	*1.0**	*1.0**
5/31/2011	*1.0**	*1.0*	*1.0**	*1.0**
7/31/2011	*1.0**	*2.0*	*1.0**	*1.0**
9/30/2011	*1.0**	*2.0*	*1.0**	*1.0**
11/30/2011	*1.0**	*1.0*	*5.0*	*1.0**
1/31/2012	*1.0**	*6.0*	*1.0**	*8.0*
3/31/2012	*10.0*	*1.0**	*1.0**	*1.0**
5/31/2012	*10.0*	*1.0**	*1.0**	*2.0*
7/31/2012	*1.0**	*1.0**	*1.0**	*1.0**
9/30/2012	*1.0**	*1.0**	*1.0**	*1.0**
11/30/2012	*1.0**	*1.0**	*1.0**	*1.0**
1/31/2013	*1.0**	*1.0**	*1.0**	*1.0**
3/31/2013	*1.0**	*1.0**	*1.0**	*1.0**
5/31/2013	*1.0**	*1.0**	*1.0**	*1.0**
7/31/2013	*1.0**	*1.0**	*1.0**	*3.0*
9/30/2013	*1.0**	*1.0**	*1.0**	*4.0*
11/30/2013	*1.0**	*1.0**	*1.0**	*1.0**
1/31/2014	*1.0**	*6.0*	*1.0**	*3.0*

3/31/2014	*1.0**	*1.0**	*1.0**	*1.0**
5/31/2014	*1.0**	*1.0**	*1.0**	*1.0**
7/31/2014	*1.0**	*6.0*	*1.0**	*7.0*
9/30/2014	*1.0**	*1.0**	*1.0**	*5.0*
11/30/2014	*1.0**	*1.0**	*1.0**	*7.0*
1/31/2015	*1.0**	*1.0**	*1.0**	*3.0*
$Cv = {}^{SD}/_{Mean}$	≈ 1.4	≈ 0.9	≈ 0.6	≈ 1.4

** Reported as below detection on the DMR, but substituted with the laboratory minimum detection levels for the purpose of reasonable potential determination.*

CONNECTICUT WATER QUALITY CRITERIA (FRESHWATER)			
	Aquatic Life		*Human Health (µg/l)*
	Acute (µg/l)	*Chronic (µg/l)*	
Chlorine	*19*	*11*	*---*
Copper	*14.3*	*4.8*	*1300*
Lead	*30*	*1.2*	*15*
Zinc	*65*	*65*	*7400*

AVERAGE OF THE LYDALL BROOK CONCENTRATION BASED ON DATA FROM SEPTEMBER 2005 TO JULY 2014 (µg/l)		
Total residual Chlorine	*11.70*	*4 data from 9/1/10 and 9/3/10 were anomalies and were not used in the calculation*
Copper, Total	*3.48*	*3 data from 9/23/10, 9/24/10 and 9/3/10 were anomalies and were not used in the calculation*
Lead, Total	*1.37*	*2 data from 9/17/07 and 9/18/07 were anomalies and were not used in the calculation*
Zinc, Total	*8.98*	*6 data from 9/23/05, 9/24/05, 9/25/05, 8/25/06, 8/26/06 and 8/27/06 were anomalies and were not used in the calculation*

REASONABLE POTENTIAL EVALUATION

(This analysis basically compares the projected maximum concentration in the effluent with the applicable water quality standard. When the projected maximum concentration is lower than the waste load allocation, this indicates that there is no potential for the discharge to exceed the water quality criterion. When the projected maximum concentration is higher than the waste load allocation, this indicates that there is potential for the discharge to exceed the water quality criterion and therefore limits are needed in the permit.)

$WLA = Waste\ load\ allocation,\ (QC)_d = Downstream\ data,\ (QC)_u = Upstream\ data\ and\ \ Q_e = \ the\ discharge\ flow$
$(refer\ to\ the\ ZOI\ calculation\ above\ for\ \ the\ downstream\ and\ effluent\ data)$

	$Maximum\ projected\ concentration\ in\ effluent = Maxumum\ measured\ concentration\ in\ effluent\ X\ multiplier\ in\ Table\ 3-1\ below$	$WLA_{acute} = \frac{(QC)_d - (QC)_u}{Q_e}$	$WLA_{chronic} = \frac{(QC)_d - (QC)_u}{Q_e}$	$WLA_{health} = \frac{(QC)_d - (QC)_u}{Q_e}$	$Is\ there\ reasonable\ potential\ to\ exceed\ WQC?$
Chlorine	$10\ X\ 4.8 = 48$	28.92	10.05	---	Yes
Copper	$6\ X\ 3.2 = 19.2$	29.00	6.59	4823.32	Yes
Lead	$5\ X\ 2.3 = 11.5$	68.90	0.97	52.04	Yes
Zinc	$23\ X\ 4.8 = 110.4$	141.12	141.12	27,485.24	No

Permit limits are not needed for zinc.

PERMIT LIMITS CALCULATION (Analysis is based on four samples per sampling month)

$LTA = Long\ term\ average,\ \ AML = Average\ monthly\ limit\ and\ MDL\ = Maximum\ daily\ limit$

	$LTA_{acute} = WLA_{acute}\ X\ 99th\ percentile\ multiplier\ in\ the\ attached\ Table\ 5-1\ (\mu g/l)$	$LTA_{chronic} = WLA_{chronic}\ X\ 99th\ percentile\ multiplier\ in\ the\ attached\ Table\ 5-1\ (\mu g/l)$	$Governing\ LTA = lower\ of\ the\ LTAs$	$AML = \ LTA\ X\ 95th\ percentile\ multiplier\ in\ the\ attached\ Table\ 5-2\ (\mu g/l)$	$MDL = LTA\ X\ 99th\ percentile\ multiplier\ in\ the\ attached\ Table\ 5-2\ (\mu g/l)$
Chlorine	28.92 X 0.153 = 4.42	10.05 X 0.281 = 2.82	*chronic*	2.82 X 2.31 = 6.51	2.82 X 6.56 = 18.50
Copper	29.00 X 0.224 = 6.50	6.59 X 0.404 = 2.66	*chronic*	2.66 X 1.85 = 4.92	2.66 X 4.46 = 11.86
Lead	68.90 X 0.321 = 22.12	0.97 X 0.527 = 0.51	*chronic*	0.51 X 1.55 = 0.79	0.51 X 3.11 = 1.59

Table 3-1. Reasonable Potential Multiplying Factors: 99% Confidence Level and 99% Probability Basis

Number of Samples	Coefficient of Variation																			
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	1.6	2.5	3.9	6.0	9.0	13.2	18.9	26.5	36.2	48.3	63.3	81.4	102.8	128.0	157.1	190.3	227.8	269.9	316.7	368.3
2	1.4	2.0	2.9	4.0	5.5	7.4	9.8	12.7	16.1	20.2	24.9	30.3	36.3	43.0	50.4	58.4	67.2	76.6	86.7	97.5
3	1.4	1.9	2.5	3.3	4.4	5.6	7.2	8.9	11.0	13.4	16.0	19.0	22.2	25.7	29.4	33.5	37.7	42.3	47.0	52.0
4	1.3	1.7	2.3	2.9	3.8	4.7	5.9	7.2	8.7	10.3	12.2	14.2	16.3	18.6	21.0	23.6	26.3	29.1	32.1	35.1
5	1.3	1.7	2.1	2.7	3.4	4.2	5.1	6.2	7.3	8.6	10.0	11.5	13.1	14.8	16.6	18.4	20.4	22.4	24.5	26.6
6	1.3	1.6	2.0	2.5	3.1	3.8	4.6	5.5	6.4	7.5	8.6	9.8	11.1	12.4	13.8	15.3	16.8	18.3	19.9	21.5
7	1.3	1.6	2.0	2.4	2.9	3.6	4.2	5.0	5.8	6.7	7.7	8.7	9.7	10.8	12.0	13.1	14.4	15.6	16.9	18.2
8	1.2	1.5	1.9	2.3	2.8	3.3	3.9	4.6	5.3	6.1	6.9	7.8	8.7	9.6	10.6	11.6	12.6	13.6	14.7	15.8
9	1.2	1.5	1.8	2.2	2.7	3.2	3.7	4.3	5.0	5.7	6.4	7.1	7.9	8.7	9.6	10.4	11.3	12.2	13.1	14.0
10	1.2	1.5	1.8	2.2	2.6	3.0	3.5	4.1	4.7	5.3	5.9	6.6	7.3	8.0	8.8	9.5	10.3	11.0	11.8	12.6
11	1.2	1.5	1.8	2.1	2.5	2.9	3.4	3.9	4.4	5.0	5.6	6.2	6.8	7.4	8.1	8.8	9.4	10.1	10.8	11.5
12	1.2	1.4	1.7	2.0	2.4	2.8	3.2	3.7	4.2	4.7	5.2	5.8	6.4	7.0	7.5	8.1	8.8	9.4	10.0	10.6
13	1.2	1.4	1.7	2.0	2.3	2.7	3.1	3.6	4.0	4.5	5.0	5.5	6.0	6.5	7.1	7.6	8.2	8.7	9.3	9.9
14	1.2	1.4	1.7	2.0	2.3	2.6	3.0	3.4	3.9	4.3	4.8	5.2	5.7	6.2	6.7	7.2	7.7	8.2	8.7	9.2
15	1.2	1.4	1.6	1.9	2.2	2.6	2.9	3.3	3.7	4.1	4.6	5.0	5.4	5.9	6.4	6.8	7.3	7.7	8.2	8.7
16	1.2	1.4	1.6	1.9	2.2	2.5	2.9	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.1	6.5	6.9	7.3	7.8	8.2
17	1.2	1.4	1.6	1.9	2.1	2.5	2.8	3.1	3.5	3.8	4.2	4.6	5.0	5.4	5.8	6.2	6.6	7.0	7.4	7.8
18	1.2	1.4	1.6	1.8	2.1	2.4	2.7	3.0	3.4	3.7	4.1	4.4	4.8	5.2	5.6	5.9	6.3	6.7	7.0	7.4
19	1.2	1.4	1.6	1.8	2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.3	4.6	5.0	5.3	5.7	6.0	6.4	6.7	7.1
20	1.2	1.3	1.6	1.8	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8	5.2	5.5	5.8	6.1	6.5	6.8

Table 5-1. Back Calculations of Long-Term Average

CV	WLA Multipliers $e^{[0.5\,\sigma^2 - z\,\sigma]}$	
	95th Percentile	99th Percentile
0.1	0.853	0.797
0.2	0.736	0.643
0.3	0.644	0.527
0.4	0.571	0.440
0.5	0.514	0.373
0.6	0.468	0.321
0.7	0.432	0.281
0.8	0.403	0.249
0.9	0.379	0.224
1.0	0.360	0.204
1.1	0.344	0.187
1.2	0.330	0.174
1.3	0.319	0.162
1.4	0.310	0.153
1.5	0.302	0.144
1.6	0.296	0.137
1.7	0.290	0.131
1.8	0.285	0.126
1.9	0.281	0.121
2.0	0.277	0.117

Acute

$$LTA_{a,c} = WLA_{a,c} \cdot e^{[0.5\,\sigma^2 - z\,\sigma]}$$

where $\sigma^2 = \ln[CV^2 + 1]$,
$z = 1.645$ for 95th percentile occurrence probability, and
$z = 2.326$ for 99th percentile occurrence probability

Chronic
(4-day average)

$$LTA_c = WLA_c \cdot e^{[0.5\,\sigma_4^2 - z\,\sigma_4]}$$

where $\sigma_4^2 = \ln[CV^2/4 + 1]$,
$z = 1.645$ for 95th percentile occurrence probability, and
$z = 2.326$ for 99th percentile occurrence probability

CV	WLA Multipliers $e^{[0.5\,\sigma_4^2 - z\,\sigma_4]}$	
	95th Percentile	99th Percentile
0.1	0.922	0.891
0.2	0.853	0.797
0.3	0.791	0.715
0.4	0.736	0.643
0.5	0.687	0.581
0.6	0.644	0.527
0.7	0.606	0.481
0.8	0.571	0.440
0.9	0.541	0.404
1.0	0.514	0.373
1.1	0.490	0.345
1.2	0.468	0.321
1.3	0.449	0.300
1.4	0.432	0.281
1.5	0.417	0.264
1.6	0.403	0.249
1.7	0.390	0.236
1.8	0.379	0.224
1.9	0.369	0.214
2.0	0.360	0.204

Table 5-2. Calculation of Permit Limits

CV	LTA multipliers $e^{[z\sigma - 0.5\sigma^2]}$ 95th Percentile	LTA multipliers $e^{[z\sigma - 0.5\sigma^2]}$ 99th Percentile
0.1	1.17	1.25
0.2	1.36	1.55
0.3	1.55	1.90
0.4	1.75	2.27
0.5	1.95	2.68
0.6	2.13	3.11
0.7	2.31	3.56
0.8	2.48	4.01
0.9	2.64	4.46
1.0	2.78	4.90
1.1	2.91	5.34
1.2	3.03	5.76
1.3	3.13	6.17
1.4	3.23	6.56
1.5	3.31	6.93
1.6	3.38	7.29
1.7	3.45	7.63
1.8	3.51	7.95
1.9	3.56	8.26
2.0	3.60	8.55

Maximum Daily Limit

$MDL = LTA \bullet e^{[z\sigma - 0.5\sigma^2]}$

where $\sigma^2 = ln[CV^2 + 1]$.
z = 1.645 for 95th percentile occurrence probability, and
z = 2.326 for 99th percentile occurrence probability

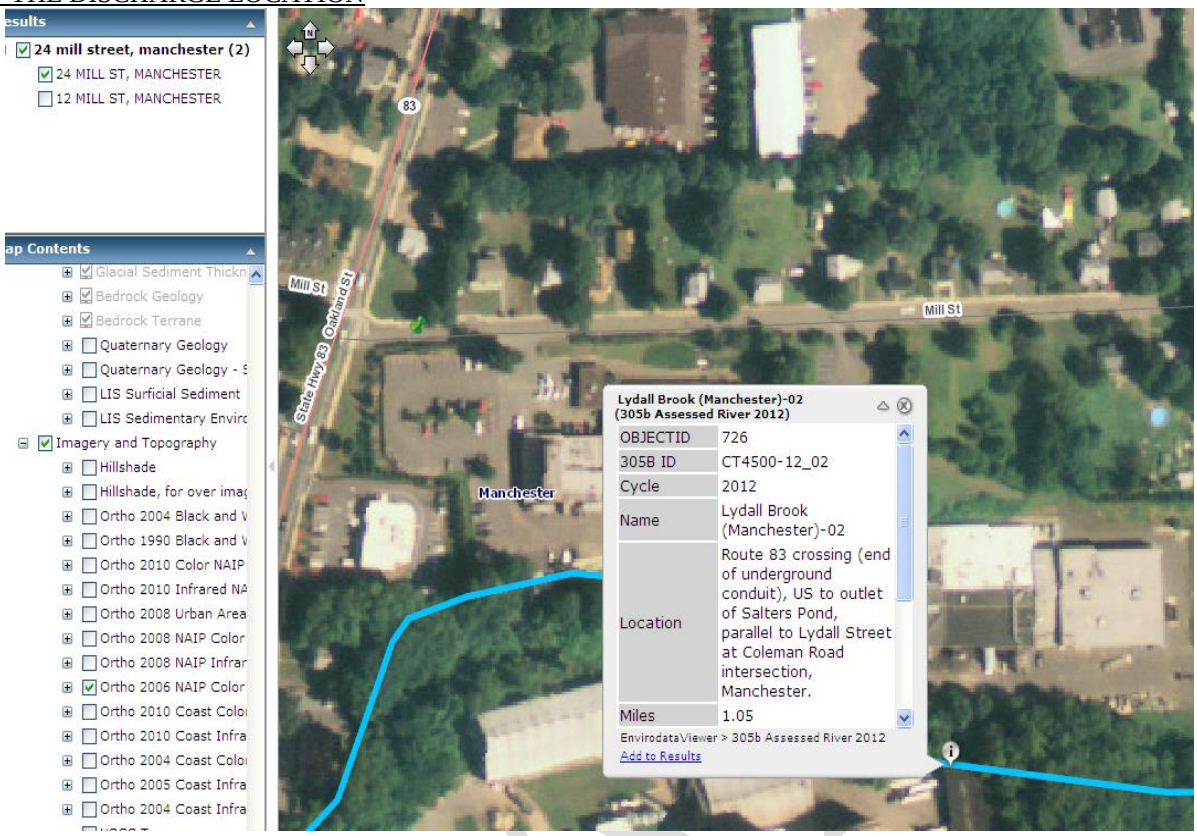
Average Monthly Limit

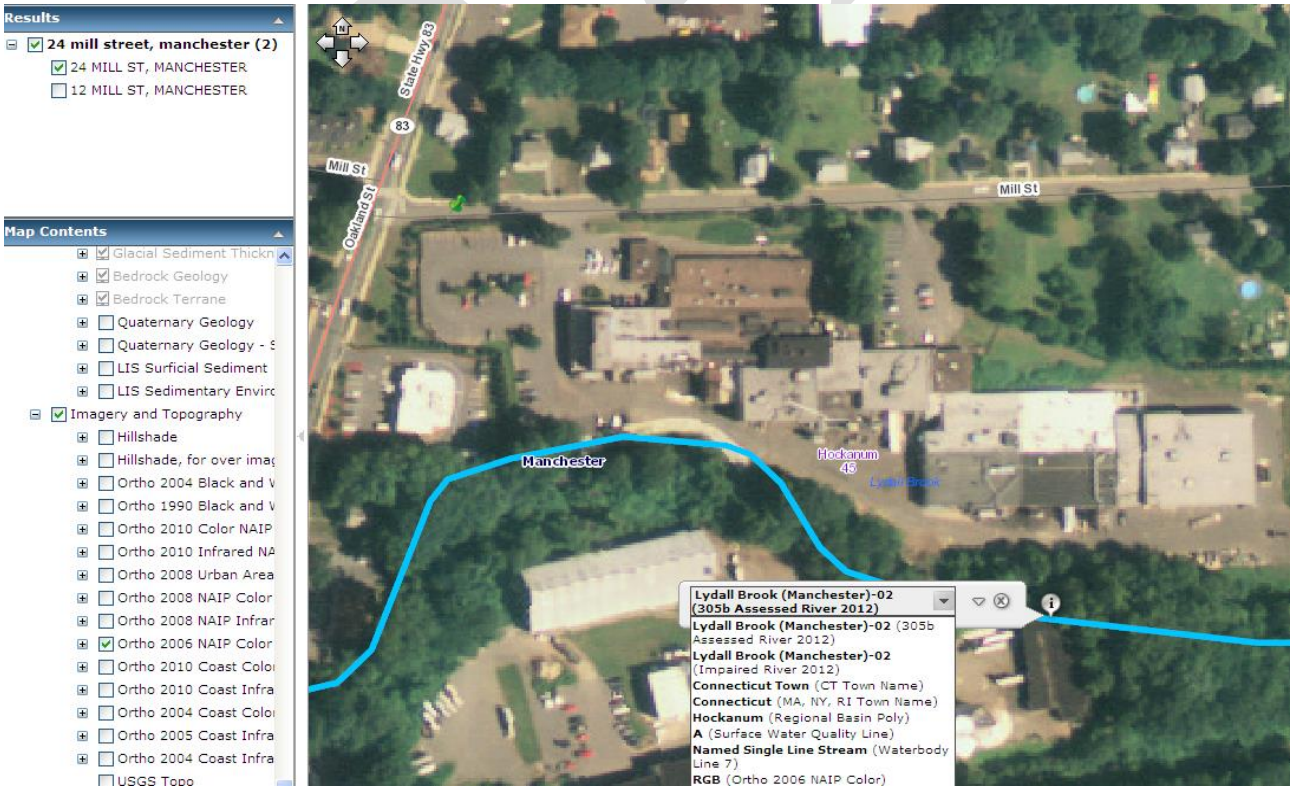
$AML = LTA \bullet e^{[z\sigma_n - 0.5\sigma_n^2]}$

where $\sigma_n^2 = ln[CV^2/n + 1]$.
z = 1.645 for 95th percentile,
z = 2.326 for 99th percentile, and
n = number of samples/month

CV	LTA Multipliers $e^{[z\sigma_n - 0.5\sigma_n^2]}$ 95th Percentile n=1	n=2	n=4	n=10	n=30	99th Percentile n=1	n=2	n=4	n=10	n=30
0.1	1.17	1.12	1.08	1.06	1.03	1.25	1.18	1.12	1.08	1.04
0.2	1.36	1.25	1.17	1.12	1.06	1.55	1.37	1.25	1.16	1.09
0.3	1.55	1.38	1.26	1.18	1.09	1.90	1.59	1.40	1.24	1.13
0.4	1.75	1.52	1.36	1.25	1.12	2.27	1.83	1.55	1.33	1.18
0.5	1.95	1.66	1.45	1.31	1.16	2.68	2.09	1.72	1.42	1.23
0.6	2.13	1.80	1.55	1.38	1.19	3.11	2.37	1.90	1.52	1.28
0.7	2.31	1.94	1.65	1.45	1.22	3.56	2.66	2.08	1.62	1.33
0.8	2.48	2.07	1.75	1.52	1.26	4.01	2.96	2.27	1.73	1.39
0.9	2.64	2.20	1.85	1.59	1.29	4.46	3.26	2.46	1.84	1.44
1.0	2.78	2.33	1.95	1.66	1.33	4.90	3.59	2.68	1.96	1.50
1.1	2.91	2.45	2.04	1.73	1.36	5.34	3.91	2.90	2.07	1.56
1.2	3.03	2.56	2.13	1.80	1.39	5.76	4.23	3.11	2.19	1.62
1.3	3.13	2.67	2.23	1.87	1.43	6.17	4.55	3.34	2.32	1.68
1.4	3.23	2.77	2.31	1.94	1.47	6.56	4.86	3.56	2.45	1.74
1.5	3.31	2.86	2.40	2.00	1.50	6.93	5.17	3.78	2.58	1.80
1.6	3.38	2.95	2.48	2.07	1.54	7.29	5.47	4.01	2.71	1.87
1.7	3.45	3.03	2.56	2.14	1.57	7.63	5.77	4.23	2.84	1.93
1.8	3.51	3.10	2.64	2.20	1.61	7.95	6.06	4.46	2.98	2.00
1.9	3.56	3.17	2.71	2.27	1.64	8.26	6.34	4.68	3.12	2.07
2.0	3.60	3.23	2.78	2.33	1.68	8.55	6.61	4.90	3.26	2.14

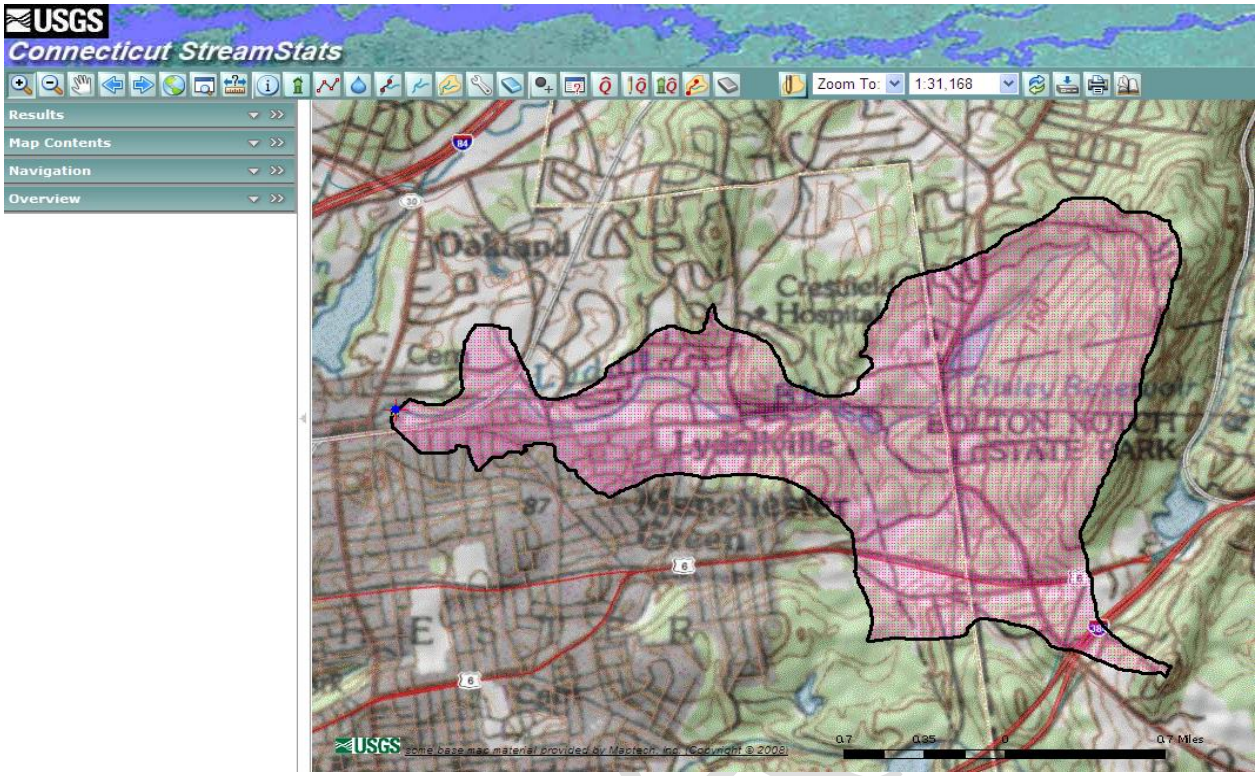
MAP OF THE DISCHARGE LOCATION





DRAINAGE AREA OF THE RECEIVING STREAM

The latitude and longitude of the discharge location are lat: N41º 47’ 46”, long: W72º 31’ 09” (Based on the information in Attachment D of the permit renewal Application No. 201302970)



USGS Connecticut StreamStats

Print

Streamstats Ungaged Site Report

ate: Wed Aug 21 2013 07:09:53 Mountain Daylight Time
ite Location: Connecticut
AD27 Latitude: 41.7960 (41 47 45)
AD27 Longitude: -72.5196 (-72 31 11)
AD83 Latitude: 41.7961 (41 47 46)
AD83 Longitude: -72.5192 (-72 31 09)
rainage Area: 3.25 mi2

Peak Flows Region Grid Basin Characteristics

100% Statewide Multiparameter (3.25 mi2)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	3.25	1.69	715
24 Hour 2 Year Precipitation (inches)	3.2	2.95	3.82
24 Hour 10 Year Precipitation (inches)	4.4	4.15	5.53
24 Hour 25 Year Precipitation (inches)	5.3	4.93	7
24 Hour 50 Year Precipitation (inches)	6.1	5.62	8.36
24 Hour 100 Year Precipitation (inches)	7.0	6.41	9.99
Mean Basin Elevation (feet)	467.59	169	1310

SALMONID SPAWNING Basin Characteristics

100% Duration Flow 2010 5052 (3.25 mi2)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	3.25	0.92	150
Mean November Precipitation (inches)	4.3	3.48	4.93
Percent Coarse Stratified Drift (percent)	37.7	0.1	55.1
Mean Annual Winter Precipitation (inches)	3.7	3.19	4.4
Percent Wetlands (percent)	0.8	0.3	18.1
Mean Basin Elevation (feet)	467.59	168	1287

APPENDIX B

Table 3-4. Connecticut Impaired Waters List (EPA Category 5)

Waterbody Segment ID	Waterbody Name	Waterbody Type	Waterbody Size	Units	Impaired Designated Use	Cause	Comment
CT4500-00_06b	Hockanum River-06b	River	0.93	Miles	Habitat for Fish, Other Aquatic Life and Wildlife	Cause Unknown	Potential sources include industrial point source discharges, remediation sites, groundwater contamination.
CT4500-00_08	Hockanum river-08	River	0.59	Miles	Habitat for Fish, Other Aquatic Life and Wildlife	Cause Unknown	Potential sources include industrial point source discharges, remediation sites, groundwater contamination
CT4500-00-3-L3_01	Union Pond (Manchester)	Freshwater Lake	49.9	Acres	Fish Consumption	Chlordane	Potential sources include remediation sites, groundwater contamination
					Habitat for Fish, Other Aquatic Life and Wildlife	Excess Algal Growth	Potential sources include non-point sources, stormwater
						Nutrient/ Eutrophication Biological Indicators	Potential sources include non-point sources, stormwater
						Sedimentation/ Siltation	Potential sources include non-point sources, stormwater
CT4500-04_01	Ogden Brook (Vernon)-01	River	2.42	Miles	Habitat for Fish, Other Aquatic Life and Wildlife	Cause Unknown	Potential sources include landfill and illicit discharge
CT4500-12_02	Lydall Brook (Manchester)-02	River	1.05	Miles	Habitat for Fish, Other Aquatic Life and Wildlife	Cause Unknown	Potential sources include industrial point source discharge, illicit discharge
CT4503-00_01	Tankerhoosen River-01	River	1.51	Miles	Habitat for Fish, Other Aquatic Life and Wildlife	Cause Unknown	Potential sources include non-point source and illicit discharge
CT4504-00_01	South Fork Hockanum River (Manchester)-01	River	1.51	Miles	Habitat for Fish, Other Aquatic Life and Wildlife	Cause Unknown	Potential sources include industrial point source discharge, municipal discharges, landfills, illicit discharge, remediation sites, groundwater contamination

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